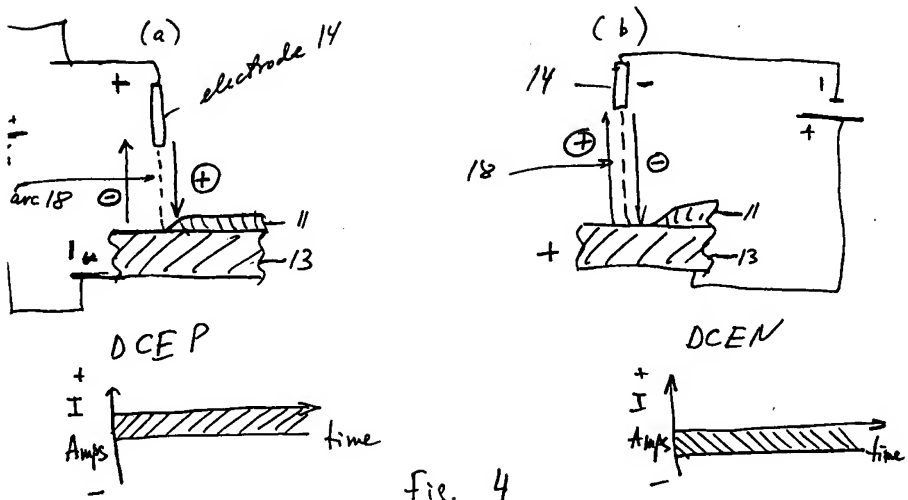
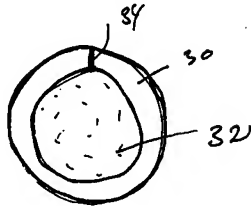


Fig. 1

Fig. 2Fig. 4

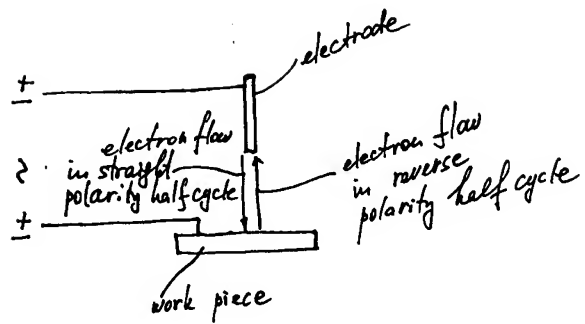


Fig. 3(a)

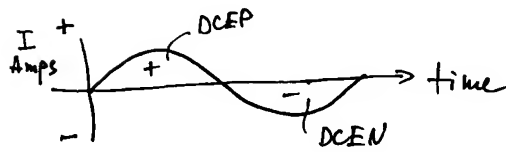
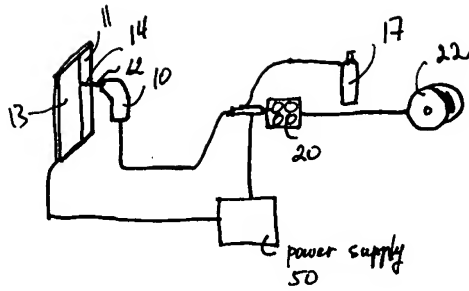


Fig. 3(b)

Fig. 5

AWS A5.18/A5.18M:2001

**Table 2**  
**Chemical Composition Requirements for Weld Metal from Composite Electrodes**

AWS Classification <sup>a</sup>		UNS Number <sup>b</sup>	Shielding Gas <sup>c</sup>	Weight Percent <sup>d</sup>									
A5.18	A5.18M			C	Mn	Si	S	P	Ni <sup>e</sup>	Cr <sup>f</sup>	Mo <sup>g</sup>	V	Cu
Multiple Pass Classifications													
E70C-3X	B48C-3X	W07703	75-80% Ar/Balance CO <sub>2</sub> or CO <sub>2</sub>	0.12	1.75	0.90	0.03	0.03	0.50	0.20	0.30	0.08	0.50
E70C-6X	B48C-6X	W07706	75-80% Ar/Balance CO <sub>2</sub> or CO <sub>2</sub>	0.12	1.75	0.90	0.03	0.03	0.50	0.20	0.30	0.08	0.50
E70C-Q(X)	B48C-Q(X)			Not Specified <sup>h</sup>									
Single Pass Classifications													
E70C-QS(X)	B48C-QS(X)			Not Specified <sup>h</sup>									

**Notes:**

- The final X shown in the classification represents a "C" or "M" which corresponds to the shielding gas with which the electrode is classified. The use of "C" designates 100% CO<sub>2</sub> shielding (AWS A5.32 Class 80-C). "M" designates 75-80% Ar/balance CO<sub>2</sub> (AWS A5.32 Class 80-AC-Y, where Y is 20 to 25). For E70C-Q [B48C-Q] and E70C-QS [B48C-QS], the final "C" or "M" may be omitted if these gases are not used for classification.
- SAE/ASTM Unified Numbering System for Metals and Alloys.
- Use of a shielding gas other than that specified will result in different weld metal composition.
- Single values are maximum.
- The sum of Ni, Cr, Mn, and V shall not exceed 0.50%.
- Shielding gas shall be as agreed upon between purchaser and supplier, unless designated by the C or M suffix.
- Composition shall be reported to the implementer on forms agreed to between purchaser and supplier.
- The composition of weld metal from this classification is not specified since electrodes of this classification are intended only for single pass welds. Dilution, in such welds, usually is quite high.

Fig. 6

**Table 2**  
**Chemical Composition Requirements for Weld Metal from Composite Electrodes<sup>a</sup>**

Single Passes <sup>b</sup>																Other Elements (%)
AWS Classification <sup>c</sup>	UNS Number <sup>d</sup>	C	Mn	Si	P	S	Ni	Cr	Mo	Co	Al	W	Cu	Nb		
Manganese-Molybdenum Weld Metal																
EROC-D2	W19130	0.13	1.00-1.50	0.50	0.025	0.010	—	—	0.40-0.60	—	—	—	—	0.35	0.30	
Chromium-Molybdenum Weld Metal																
EROC-B2L	W32130	0.05	0.40-1.00	0.32-0.60	0.025	0.010	0.30	—	1.00-1.50	0.40-0.60	—	—	—	0.35	0.30	
EROC-B2	W32020	0.05-0.12	0.40-1.00	0.32-0.60	0.025	0.010	0.30	—	1.00-1.50	0.40-0.60	—	—	—	0.35	0.30	
EROC-B3L	W32130	0.05	0.40-1.00	0.32-0.60	0.025	0.010	0.30	—	1.00-1.50	0.40-0.60	—	—	—	0.35	0.30	
EROC-B3	W32020	0.05-0.12	0.40-1.00	0.32-0.60	0.025	0.010	0.30	—	1.00-1.50	0.40-0.60	—	—	—	0.35	0.30	
Nickel-Based Weld Metal																
EROC-N1	W11020	0.13	—	1.50	0.030	0.025	0.020	0.005	0.05-0.10	—	—	—	—	0.35	0.30	
EROC-N2	W22020	0.08	—	1.20	0.030	0.010	0.010	0.005	0.05-0.10	—	—	—	—	0.35	0.30	
EROC-N3	W22020	0.13	—	1.50	0.030	0.010	0.010	0.005	0.05-0.10	—	—	—	—	0.35	0.30	
EROC-N3	W22020	0.13	—	1.50	0.030	0.010	0.010	0.005	0.05-0.10	—	—	—	—	0.35	0.30	
Other Low-Alloy Weld Metal																
EROC-D	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Notes:

- Chemical requirements for composite electrodes are based on analysis of their weld metal to the as-welded condition and using the analysis per specified in Table 1.
- The weld metal shall be analyzed for the specific elements for which values are shown in this table. If the presence of other elements is indicated in the course of this work, the amount of these elements shall be determined to assure that their total (excluding iron) does not exceed the limits specified for "Other Elements, Total."
- Single values shown are maximums.
- Single electrodes are generally recommended for gas tungsten arc welding (GTAW) or plasma arc welding (PAW).
- SAW/ATM Unified Manufacturing Systems for Metals and Alloys.
- In order to meet the requirements of the O'Connell System, the electrodes must have as a minimum of one or more of the following: 0.30 percent nickel, 0.30 percent chromium, or 0.30 percent molybdenum. Compositions shall be reported, the requirements are listed against by the purchaser and supplier.

Fig. 7